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ABSTRACT

Although energy development ultimately produces some additional tax revenues, these revenues are usually much lower during early development stages than after the energy-producing operation begins, thus creating an early shortrun imbalance between government revenues and expenditures. State and federal loans, impact aid for operating expenses, and grants ease such financial problems. This study describes the front-end problems which will accompany coal development and electric generating plant construction in the Northern Great Plains. The ENERGYTAX simulation model is used to obtain timepaths for new state and local government revenues from energy projects typical of those being developed in the region. Separate estimates of new revenues from a 5-million ton per year coal mine, an 801-megawatt electric generating plant, and the combination of the two are provided for locations in Montana, North Dakota, and Wyoming. Revenues for each year of construction and start-up and for the new projects' first 5 years of operation are shown for the state, school district, city, and county governments in each state. Tax and aid systems differ considerably among these states, so the individual revenue paths illustrated provide useful insights into the advantages and disadvantages of various taxes and aids during periods of rapid growth. (Author/BRR)

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Energy Development:

Initial Effects on Government Revenues

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Energy Development:

Initial Effects on Government Revenues

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Abstract

Energy development can cause shortrun financial problems for local governments. Although such development produces some additional tax revenues, these revenues are usually much lower during early development stages than after the energy-producing operation begins. This creates an early shortrun imbalance between government revenues and expenditures. State and federal loans, impact aid for operating expenses, and grants ease such financial problems. The ENERGYTAX simulation model is used to illustrate this problem, tracing the time-path of new local revenues from a coal mine, an electric generating plant, and a combination of the two for developments in Montana, North Dakota, and Wyoming.

Keywords: Energy Development, local government revenue, Northern Great Plains

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Introduction

Industrial growth can have long-range effects on a local government's ability to furnish services. Local planners and government officials must plan the financing of such services based on their knowledge of the area and forecasts of new population, payrolls, employment, and income.

But even when longrun impacts are favorable, local governments may face serious problems during the project's early years. Revenue shortfalls and higher-than-anticipated expenditures are common during the construction phase for many projects. When the construction work force is greater than the operating work force, an additional strain is placed on the community's ability to finance government services. Such shortrun imbalances between government expenditures and revenues often occur during mineral development and generating plant construction.

This study describes the front-end problems which will accompany coal development and electric generating plant construction in the Northern Great Plains. The ENERGYTAX simulation model is used to obtain timepaths for new state and local government revenues from energy projects typical of those being developed in the region. Separate estimates of new revenues from a 5-million ton per year (mmtpy) coal mine, an 801-megawatt electric (MWe) generating plant, and the combination of the two are provided for locations in Montana, North Dakota, and Wyoming. Revenues for each year of construction and startup (3 years for the mine, 5 years for the powerplant) and for the new projects' first 5 years of operation are shown for the state, school district, city, and county governments in each of the three states. Tax and aid systems differ considerably among these states, so the individual revenue paths provide useful insights into the advantages and disadvantages of various taxes and aids during periods of rapid growth.

Sources of Change in Government Revenues

Economic and institutional factors affect the timing of new state and local government revenues generated by mine or powerplant development.

Economic factors depend primarily on the new facility's

design and are often closely related to its construction schedule. Their effects will be similar for all projects of a particular type, no matter where the project is located. Economic factors include the timepath of construction and operating employment, the timing of major equipment purchases, the amounts of equipment and supplies purchased locally, and the length of the construction period. The firms involved in the construction most often make these decisions on an engineering basis, but these decisions also determine the project's primary impact on the local economy and on local revenues.

Secondary or indirect effects of the new economic activity include the effect of the new plant and its employees on existing businesses in the area, and the rate at which the new economic activity is translated into increased employment. The propensity of the new work force to commute from outside the community rather than relocate near employment is another important factor, especially during construction.

Economic factors play a major role in determining both the amount and timing of new revenues, but for the most part, they are beyond control of policymakers. Institutional factors, on the other hand, are determined primarily by the structure of the state's tax and aid system. They will have similar impacts on all types of projects within a state. This report focuses on institutional factors--items which in some instances can be modified by state or local officials. The remainder of this section focuses on three areas--property taxes, other taxes, and intergovernment aid--where differences in state laws and administrative practices produce timing variations in local government revenues (see also Voelker, 1981).

Property Taxes

Property taxes are the principal revenue sources for most local governments. States differ, however, in the amount of money raised by local property taxes and in the time it takes before local governments receive it. Differences in the types of property included in the tax base and in local assessment and millage rates account for the variation in the amount.

There are two major differences among the tax bases of Montana, Wyoming, and North Dakota. Montana and Wyoming levy local property taxes on business personal property as well as on land and buildings, while North Dakota excludes all personal property from the property tax. This exclusion greatly reduces the amount any new project adds to the local tax base, since much of the investment in a mine or powerplant goes for the purchase of equipment and machinery.

The Northern Great Plains states also differ in the way they value mineral property. In Montana and Wyoming, annual gross

proceeds from the mine--the per-ton value multiplied by the number of tons produced--is used as a proxy for the value of the mineral deposit. Mineral values in North Dakota are ignored and only the surface value of the land is subject to tax. However, North Dakota localities are allowed to share in the state severance taxes on the mine's production, which in some instances may produce more local revenue than the property tax in Montana and Wyoming.

The length of time before local governments actually receive any new property tax revenue is determined by the state's schedule for assessing property and levying and collecting property taxes. The importance of this set of administrative rules can be shown by tracing the assessment, levy, and tax collection process for a new structure.

Before construction begins, taxes are based only on the assessed value of the land where development is to occur. That initial value may reflect development potential or it may reflect only agricultural value. If the latter is true, a reassessment reflecting the new land use may occur once construction begins. That reassessment, however, will produce only a small increase in revenue for local government. Taxes on the new structure and on any equipment or machinery used by the firm will be the major source of increased revenue.

New structures are not usually assessed until they are complete and ready for use. Their value is then added to the value of the land and entered on the local tax rolls. State law provides that all assessments be fixed on a specific date each year so that the year's taxes can be levied. If construction and assessment are completed just prior to that date, new property will be subject to tax almost as soon as it is finished. But taxes will not be levied until the following year if construction is not finished until after the closing date. Property tax rolls close on January 1 in Montana, and on February 1 in North Dakota and Wyoming.

If construction takes longer than a year, serious financial problems can occur if the new plant pays no taxes until the project is complete. For mines or powerplants, for example, there could be delays of 5 or more years before any new assessed value is added to the tax rolls. During that time, however, the construction and operating work force and families would use local schools and other local government services, creating a drain on the local treasury. Many states, including all three states in this study, now assess large, multiyear construction projects on a percentage-completed basis. This helps reduce shortrun imbalances between local government revenues and expenditures.

The lag between completion of construction and levying the tax is only the first source of delay in the property tax process. There is also a lag between levying and collecting the

tax. Taxes are not typically due and payable at the time levied. This further slows receipt of the revenues by local government.

Montana taxes levied on January 1 are due in two equal installments--half on or before November 1 and half before May 31 of the following year. In North Dakota, half the taxes levied on February 1 is due on March 1 of the following year, and the remainder is due on October 15. Wyoming's due dates are November 10 of the year of levy and May 10 of the year following.

Lags of at least 8 months exist in all three states before a locality receives any new revenue. This is in addition to whatever delay occurred between the initiation of construction and the assessment date. And there will be at least a 16-month lag before the full first year's tax payment is available for spending. North Dakota has the longest lags of the three states in this study. A structure completed there after February 1 could be occupied for 2 full years before any taxes are available, and for 2 years and 8 months before the first full year's taxes are received. Such delays in obtaining new revenue can have a significant impact on local finances when local population increases rapidly.

The tax calendar is the same for all types of property except mobile homes. Some states, including Montana and North Dakota, treat mobile homes differently because they can be relocated easily before local property taxes are levied. Further, short-term residents--such as those in construction trades--may have already left the state before taxes on their mobile homes come due. This allows some residents to receive local government services without paying for them. North Dakota, noting that possibility, has compressed its entire assessing, levying, and collecting process. There, a special license must be obtained within 30 days of the time the mobile home enters the county. The license fee is approximately equal to the local property taxes that would be due. Revenue from those fees is divided among local governments in proportion to local millage rates. Tax payments by mobile home owners accelerate as a result. The lag would be more than 2 years without this program. With it, the lag is only 30 days.

Other Taxes

State and local governments receive new revenue from a number of other types of taxes, such as income taxes (Montana and North Dakota) and sales taxes (North Dakota and Wyoming). All three states levy severance or production taxes on minerals and special excise taxes on liquor, cigarettes, and gasoline. North Dakota and Montana also levy taxes on production of electricity. Collections from these taxes are more nearly on a current basis than those for the property tax. Consequently, changes in the economic variables--new jobs, tons of coal mined or megawatt

hours of power produced, and new local residents--determine the timepath of local revenues. A lag of 3 months between the change in economic activity and receipt of the new revenue by the state or locality appears to be standard for most of these other taxes.

This rapid increase in revenue is vital during the early phases of the construction period, since little additional property tax revenue is yet available. Sales and use taxes are especially important, particularly if a portion of state collections is returned to the locality where the purchases were made or if there is a local sales tax. Particularly if the source of development purchases a large portion of the construction equipment and materials locally, local sales tax can lessen front-end financial problems for some local governments.

Intergovernmental Aid

Local governments receive three types of financial aid from state and federal governments: discretionary grants, shared taxes, and formula aid.

Discretionary grants are dispersed without regard to any particular formula. The aid is given at the discretion of the responsible agency, usually following application by a local government. Since the amount of these aids--which include special energy impact grants available in each of the three states--cannot be predicted, they have no certain impact on either the amount or timepath of local revenues.

Sharing a portion of a state-collected tax is another type of aid. North Dakota's program of returning a portion of the severance tax and coal conversion tax collections to local government is an example. Other states rebate part of cigarette, sales, use, and gasoline tax collections to localities. There are lags between the time the tax is collected, the time the state receives the funds, and the time the state returns the money to the appropriate local government. But these lags are usually short (often only a quarter), so such aids are more responsive than is the property tax to changes in local economic activity. In North Dakota, for example, the local share of the severance tax is available to localities nearly 2 years sooner than would be property taxes levied on the mine's gross proceeds.

Formula aids are usually related to a measure of local population. School foundation programs are the best known examples of formula aid, but a number of programs exist which apportion funds to localities based on population. Federal revenue sharing is another example. Usually, state formula aids--except school aids--are not responsive to changes in local activity, because they are required to be based on estimates of population from the most recent census. Sometimes, even the decennial census is the base. Since the locality would have to

pay for a special census, new population levels for aid purposes will probably not be established very often. Formula aids are usually an unlikely source of new revenue during periods of rapid growth, except for school aids (which are based on the number of children enrolled or attending school on a particular date) or federal revenue sharing.

The ENERGYTAX MODEL

Revenue projections for this study came from the ENERGYTAX simulation model. This model estimates state and local government revenues by type of government and source of revenue for proposed energy developments in Montana, North Dakota, and Wyoming.

ENERGYTAX relies on a series of accounting identities which reflect the state and local tax structure (see also Stinson and Voelker, 1978). The model estimates all major taxes, formula aids, and taxes shared with local government. Discretionary aids and federal revenue sharing are excluded, resulting in lower estimates than the actual new revenues to be available.

ENERGYTAX is not a true dynamic model, but its structure is broad enough so that it can be adapted for dynamic simulations. By updating the input data to reflect the expected timepath for employment, production, and assessed value, results from a sequence of single-year simulations can be used to represent the timepath for the local revenues. Lags in revenue collection and in aid payment can be shown by choosing appropriate input data.

ENERGYTAX requires a relatively detailed set of data on the installations to be evaluated. Estimates of property values, purchases, production, employment, and net income must be provided for each year's simulation. Assumed local property tax millage rates and some estimates of family size and composition of new households are also required. The quality of the input data largely determines the accuracy of results.

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The Model Mine and Generating Plant

Data on the 5-mmtpy coal mine used in the simulation were based on a model strip mine developed under contract for the U.S. Bureau of Mines (Skelly and Loy Engineers, 1975). The model was later updated to reflect prices and wage rates in 1976 (Stinson and Voelker, 1978, pp 30-37). Data on the coal-fired electric powerplant came from the U.S. Nuclear Regulator Commission and were also based on 1976 prices (United Engineers and Constructors, Inc., 1978).

Construction and startup scenarios reflect standard industry practice. Additional data on the construction pattern of the generating plant were obtained from a report by the Electric Power Research Institute (1977). Employment scenarios for the construction period were taken from published data on employment at similar projects, then checked against estimates of construction manpower requirements prepared by the North Dakota State Board for Vocational Education (1977).

Estimates of the changes in local economic activity were selected to be consistent with those used in other simulation models of development impacts on the Northern Great Plains. The longrun employment multiplier was assumed to be 1.5. The multiplier during the construction period was assumed to be somewhat less to reflect the transitory nature of some of the increase in business activity. The longrun equilibrium level in employment was assumed to be reached the year following the beginning of operation for the plant or mine. A complete list of the input data appears in Appendix, Tables 1-6.

Another economic factor significantly affecting local revenue is the type of housing chosen by the work force. The assumed longrun levels--69 percent owner-occupied single-family dwellings, 15 percent mobile homes, and 16 percent apartments--were taken from a North Dakota State University survey of housing preferences of new mine and powerplant workers in that state (Leholm and others, 1975).

The same percentages could not be used for construction workers. An implication of the inappropriate use of these percentages would have been the construction of several hundred new homes for only 1 year of use. In addition, there would be a sizable number of vacant rental units. The following housing assumptions were made to avoid that overbuilding (see Appendix, Tables 4-6):

- Only those apartments needed to meet long-term demand

would be constructed, and those would all be available for occupancy after the first year.

- Mobile home spaces were limited to a number which would ensure full occupancy for 3 years, and a 75-percent probability of occupancy during the fourth year.

- Single-family housing would increase at a relatively constant rate of approximately 15 units per year during the construction and startup period.

- Full housing equilibrium would be reached in year 7 for the mine, year 8 for the plant.

These assumptions produce a housing shortage during years 2 and 3 of the powerplant's construction. Nontraditional sources of housing such as motels and sleeping rooms, often used during construction, will help fill the excess demand, as will commuting from outside the local taxing districts. These conditions, coupled with the use of existing vacant housing, indicate that fewer new housing units than new jobs will be added to the tax rolls during the construction period.

Some persons taking new jobs in the service sector may already live in the area, and others will be spouses of new workers at the mine or powerplant. It was assumed that only half of all new service-sector jobs would be filled by heads of household. This assumption helps avoid overstating the number of new housing units required by service employees.

Estimates of family composition, particularly number of school children, are also necessary. North Dakota survey data provided the basis for the estimates used. For the long run, the average worker's family was assumed to have 0.58 grade school students, 0.20 junior high school students, and 0.39 high school students. Total family size was assumed to average 3.37, with 87 percent of the workers married (Leholm and others, 1975, p 26). But since construction workers as a group are less likely to have school-age children and are less likely to move their families to the area of their employment, the ratio of school-age children to workers was arbitrarily lowered. Appendix Tables 4-6 also provide a listing of the family composition input data.

Assumptions about housing choice, family composition, and number of families locating in the area are important factors in determining new revenues received by local governments. Estimates of new per capita revenues for the county and the local school district, however, are fairly insensitive to changes in these parameters. Taxes paid by the new firm and school foundation aid are major factors influencing those revenues. City revenues, however, are sensitive to specifications of housing choice. Estimates of the size of the front-end impacts for cites depend considerably on assumptions made about housing choice and family size.

Results

Northern Great Plains coal development studies generally agree that combined state and local government revenues attributable to a particular new mine (or generating plant) and its employees are more than sufficient to pay for the additional government services required (see, for example, Krutilla and Fisher, 1978; Murdock and Leistritz, 1979; and Stinson and Voelker, 1978).

But these studies report that the distribution of revenues among various levels of government may cause financial problems. Cities, for example, often appear to receive less than they need to maintain services whle state governments appear to receive more.

ENERGYTAX simulation results generally agree with previous findings in this area. The dynamic simulations also provide strong evidence about the extent of the front-end financial problems facing local governments. Detailed accountings of new revenues appear in the Appendix, Tables 8-16.

Mine

Timepaths for new state and local government revenues from a 5-mmtpy coal mine appear in Figures 1-4. Each figure shows the estimated annual revenue received by a particular type of government from the mine, its employees, other new business activities stimulated by the mine opening, and any new employment associated with the new business activity. To facilitate comparisons, total revenue is divided by the number of expected new residents (or new pupils for school districts) to obtain the estimated new revenue per new resident (or pupil). For local government, the revenue estimates include intergovernmental aids. For state government, the revenue estimates are net of intergovernmental aids and revenues earmarked for specific uses, such as that portion of the severance tax designated to go to a state's coal impact aid fund.

The figures also include dotted comparison lines representing 1977 average per capita expenditures by that level of government in each state. For cities, a line is provided showing total (operating and capital) expenditures and one showing only operating expenditures. The expenditure figures, from the 1977 Census of Governments, should not be interpreted as a projection of the level of spending. Actual spending levels depend on local

characteristics. (For a more complete discussion of the effects of rapid population growth on local government expenditures, see Stinson, 1981.)

Once the mine begins operation (year 4), new revenues are more than sufficient to meet government service needs for all units of government except Montana and Wyoming cities. There, long-term per capita revenues of $47 and $160, respectively, are far below the average per capita city expenditures. Even when the costs of new capital equipment--schools, water and sewer lines, and streets--are ignored, cities in those states can expect financial problems since revenues are insufficient to cover operating costs.

Cities in North Dakota receive substantially more--approximately $300 per new resident, an amount exceeding current levels of per capita expenditures by cities. The difference is due primarily to North Dakota's program of returning a portion of the state-collected severance tax to local governments in the county where it was collected. Thus, cities in North Dakota receive a share of the taxes paid by the mine while those in Montana and Wyoming do not.

This contrast between revenues for cities in North Dakota and those in Montana and Wyoming highlights the importance to local governments of the revenue obtained from the mine. Those school districts and counties receiving a substantial population increase but unable to tax the mine face potential deficits like those for Montana and Wyoming cities.

Particularly visible in Figures 1-4 is the size of the local front-end deficit. Only in cities and counties in Wyoming, where a local sales tax is available, will revenues exceed or nearly equal average spending levels during the first 2 years of operation.

State. State government revenues are below average state expenditures for the first 2 years of the project's life in Montana and Wyoming (Figure 1). New sales tax revenues in North Dakota are sufficient to provide slightly more revenue. Once severance tax revenues begin to accrue, however, revenues surge to levels considerably beyond state per capita expenditure in all three states. Montana's change is most noticeable: revenues are $193, $251, and $1,457 per new resident during years 1 through 3. They are more than $3,500 in year 4. In year 5 and beyond, the revenues are more than $4,000 per new resident. Per capita state expenditures in Montana were $830 in 1977.

School District. Deficits for school districts were not as severe (Figure 2). All three states receive new revenues in excess of average per pupil expenditures in their states by year 4. Per pupil revenues in Montana and North Dakota are never more than a few hundred dollars per student below existing operating expenditure levels. Once the mine is fully operational, new

revenues surge in all three states. In Wyoming, where the school revenues average less than $250 per new pupil during the first 2 years of the mine's development, revenues increase to more than $3,000 per new student in year 3 and reach a long-term level of $5,700, nearly three times the general expenditure level of $1,980 in the state by year 5. School districts in North Dakota also receive new revenues in excess of average per pupil expenditure. The steady-state level--the level which exists after all changes have had time to work their way through the system--is more than $2,250 per new pupil. Average total expenditures (both operating and capital) in 1977 are only $1,600. Montana results are similar to those in North Dakota, with revenues reaching a steady-state level of more than $2,100 per new pupil.

County. Counties in Montana and North Dakota show a similar pattern with low revenues and potential front-end deficits during the first 2 years of construction, then a jump to revenue levels above average per capita spending when new property tax receipts or their share of state severance taxes become available (Figure 3).

The pattern is somewhat different for Wyoming counties. There, even during the first 2 years, revenues are nearly equal to average per capita expenditures by counties. When the new property value associated with the mine has its full impact, revenues surge to more than $800 per new resident, or more than 2 1/2 times average per capita county expenditures in the state. The reduced front-end impacts are due primarily to the local sales tax collected on the machinery, equipment, and supplies for the mine and to the return of a portion of locally collected state sales taxes. A local sales tax, as seen several times in these simulations, is a strong tool for reducing front-end impacts.

City. Timepaths of city revenues show the most dramatic differences among the three states (Figure 4). Montana, with neither a local sales tax nor a program returning some of the severance taxes collected by the state directly to affected cities, has a relatively flat pattern of revenues. The lags in assessment and collection are evident in year 1, but from year 2 on, new revenues per new resident grow at a relatively constant rate. These new revenues finally reach a longrun level of about half the average per capita operating expenditures of cities in the state.

North Dakota cities startout with new revenues approximately equal to those in Montana. But, once the mine begins operation, the city share of state severance tax collections provides considerable new revenue. For the long run, North Dakota cities annually receive more than $300 per new resident attributable to the mine. Total expenditures by cities averaged only $237 per capita in 1977.

Wyoming results are just the opposite. Revenues are considerably greater than average per capita city expenditures during the first 3 years of the mine's life. This is due to local sales taxes paid on new equipment and material for the mine. After mining begins, however, revenues drop substantially, eventually reaching longrun levels of approximately $150 per new resident. This is slightly below average current expenditures by cities in the state, and only about 60 percent of total per capita city expenditures. Wyoming cities, unlike those in Montana and North Dakota, exhibit no front-end problems. They do, however, face longrun deficits.

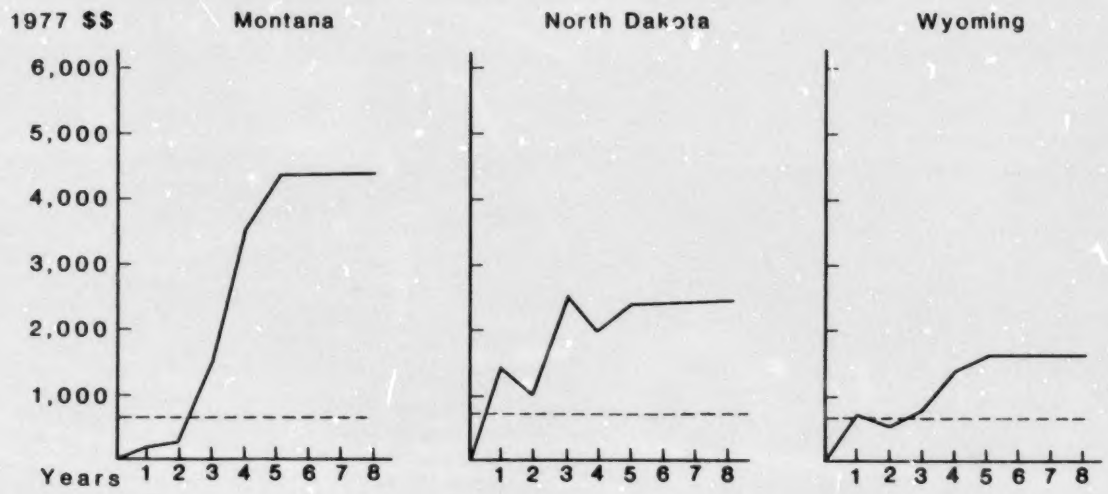

Figure 1. Mine*: New state government revenues per new resident due to development and operation. Key: ———— = Estimated revenues per new resident
--------- = Estimated per capita expenditures

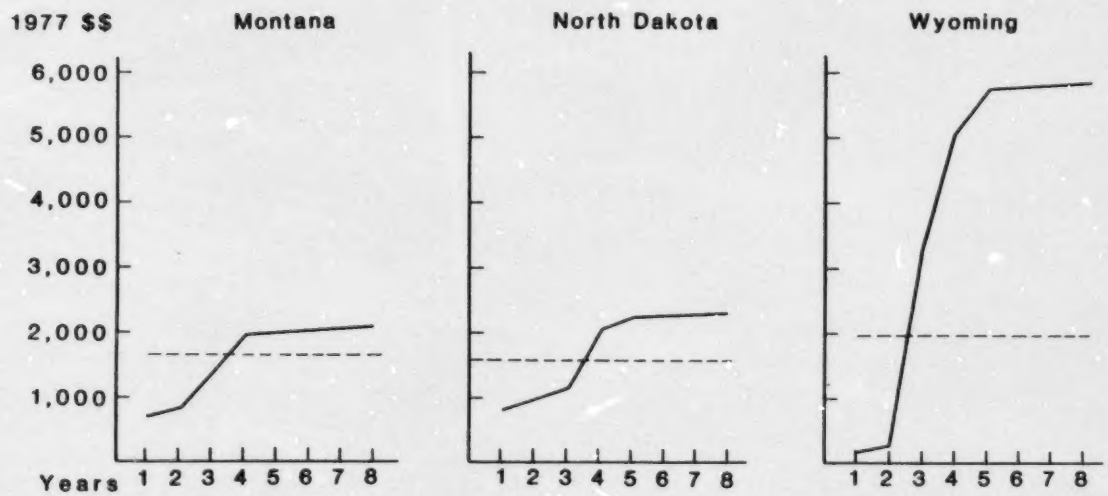

Figure 2. Mine*: New school district revenues per new pupil due to development and operation. Key: ———— = Estimated revenues per new pupil
--------- = Estimated per pupil expenditures

*Mine refers to a 5-mmtpy coal strip mine (see text).

SOURCE: ENERGYTAX simulations; U.S. Bureau of the Census, 1977 Census of Governments.

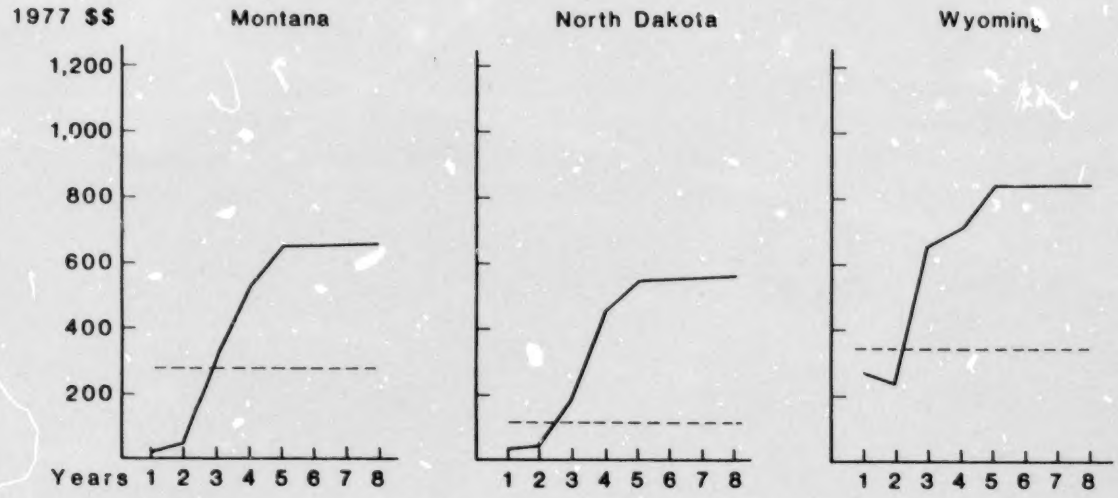

Figure 3. Mine*: New county government revenues per new resident due to development and operation. Key: ———— = Estimated revenues per new resident
--------- = Estimated per capita expenditure

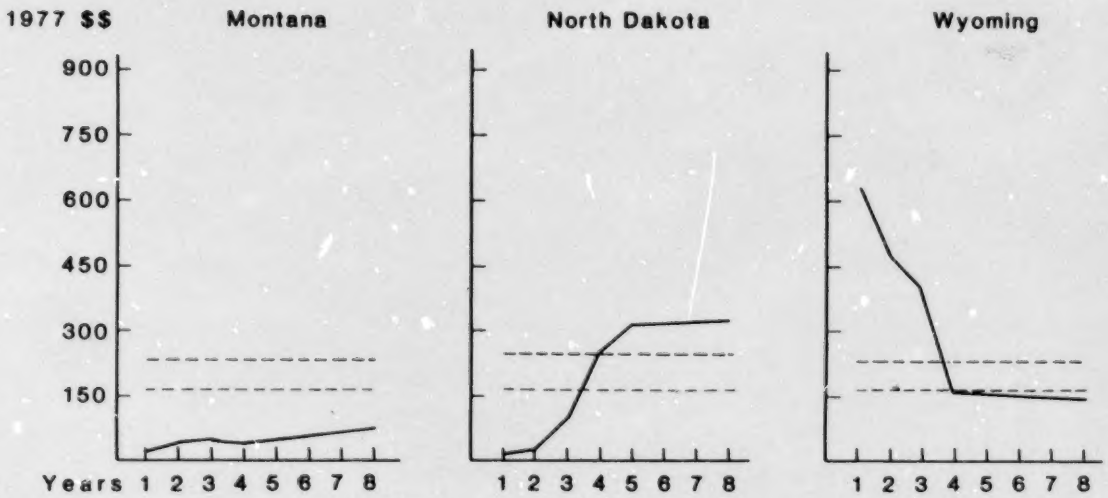

Figure 4. Mine*: New city government revenues per new resident due to development and operation. Key: ———— = Estimated revenues per new resident
--------- = Estimated expenditures (total and operating)

*Mine refers to a 5-mmtpy coal strip mine (see text).

SOURCE: ENERGYTAX simulations; U.S. Bureau of the Census, 1977 Census of Governments.

Generating Plant

Longrun results from the powerplant simulation resemble those for the mine. Montana and North Dakota state governments, schools, and counties receive revenues in excess of current per capita or per pupil spending levels, while cities in all three states receive less. North Dakota cities do not receive sufficient new revenue from the shared coal conversion tax to meet average per capita expenditure, and state revenues in Wyoming are less than average state expenditures. There, per capita revenues per new resident are less than a tenth of those in North Dakota and Montana, and only slightly more than half the average state expenditure.

State. Differences in state tax structure are quite apparent in the timepath of state revenues (Figure 5). Longrun differences in revenue between Wyoming and the other two states can be attributed to two different taxes. Montana and North Dakota levy a corporate income tax and an energy production tax on electricity generating plants. The corporate income tax is especially important since utilities usually have significant amounts of taxable income. The estimates of the state corporate income tax probably overstate the actual amount paid by the firm; they come from a relatively simple algorithm which does not account for special tax rules on investment credits, loss carry forwards, and accelerated depreciation. Corporate income tax revenues could be significantly less in both states and still leave revenues considerably greater than those in Wyoming, however. A second potential problem with state corporate income tax estimates is the multistate tax compact for apportioning income from firms operating in more than one state. In this example, the powerplant is assumed to be owned by a utility doing business solely with the state in which the plant is located.

State results are different during construction and startup. The two sales tax states--North Dakota and Wyoming--receive more revenue than Montana. But even so the large number of new workers produce a front-end deficit for all 5 years in Wyoming, years 1 to 3 in Montana, and years 3 and 4 in North Dakota.

School District. The timepath of new revenue for schools is more favorable (Figure 6). Unlike the school revenue pattern associated with the mine, where much of the new revenue is delayed until after production begins, new per pupil revenues exceed average expenditures per pupil by year 3 in both Montana and Wyoming. This occurs even though the plant is not operating at full capacity until year 6. However, in North Dakota, where only the land and the physical structure of the plant are subject to tax, revenues are substantially less. They average about $250 per pupil below the state's average operating expenditures by school districts. Even though a portion of the state energy conversion tax is returned to school districts in the county containing the plant, that additional revenue is not sufficient to lift revenues above the average level of per pupil

expenditures in the state. In contrast, Wyoming and Montana school districts may be able to lower their school millages because of the large additions the new generating plant makes to assessed value.

County. County revenues follow the same pattern as they did with the mine (Figure 7). Low in the first 2 years, the revenues surge after a portion of the plant's value goes on the tax rolls. In Wyoming, though, the local sales tax and rebate of some of the state sales tax lifts county revenues above average per capita expenditures by year 2. North Dakota revenues are significantly less than those in the other states because only the land and structures, and not the equipment and machinery of the plant, are subject to tax. The new longrun revenues per capita in Montana and Wyoming are nearly four times greater than average in 1977 per capita expenditures by county governments in those states.

City. As they did in the mine simulation, city revenues show the most variation in timepaths (Figure 8). Wyoming cities have large surpluses in the early years of construction due to the local sales tax. When these large initial purchases cease, however, new per capita revenues drop to long-term levels below those in either Montana or North Dakota and less than a fourth as much as the state's average municipal expenditure of $211 per capita.

The impact of the new powerplant on North Dakota cities is not as favorable as was the new mine. The amount of the state energy conversion tax returned to cities is insufficient to lift average revenue per new resident to a level equal to the state average expenditure by cities. The result is a sizable front-end deficit associated with the generating plant, and a permanent deficit. New revenues are even less in Montana. There, revenues are always less than the state average per capita expenditures by cities.

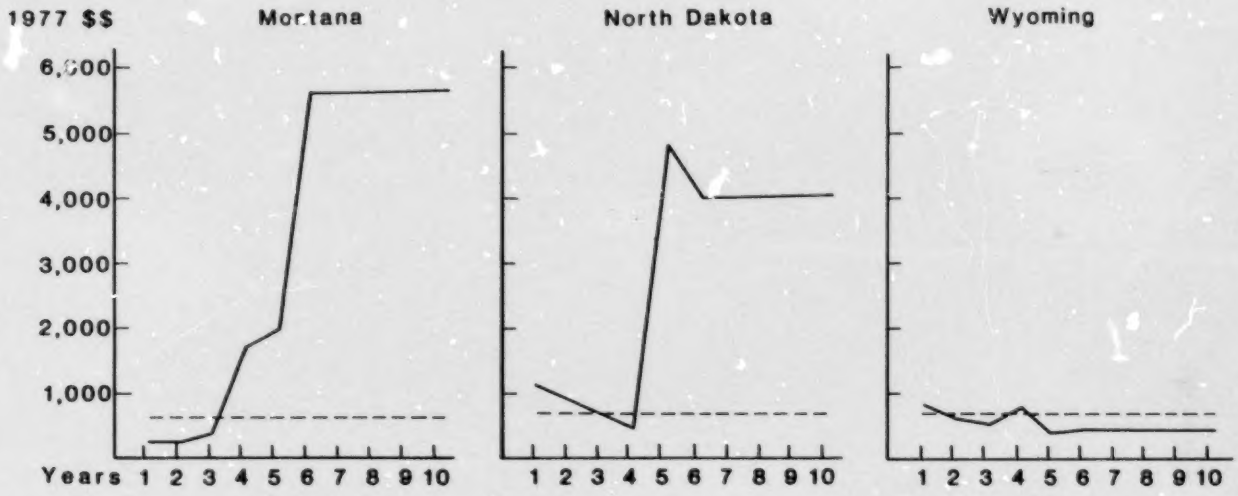

Figure 5. Generating plant*: New state government revenues per new resident due to construction and operation. Key: ———— = Estimated revenues per new resident
--------- = Estimated per capita expenditures

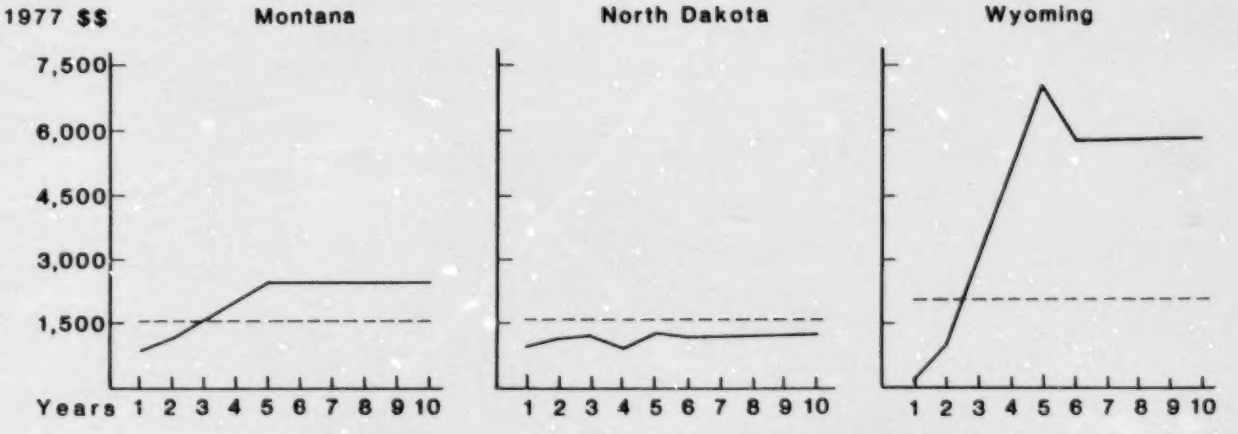

Figure 6. Generating plant*: New school district revenues per new pupil due to construction and operation. Key: ———— = Estimated revenues per new pupil
--------- = Estimated per pupil expenditures

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*Generating plant refers to an 801-MWe coal-fired generator (see text).

SOURCE: ENERGYTAX simulations; U.S. Bureau of the Census, 1977 Census of Governments.

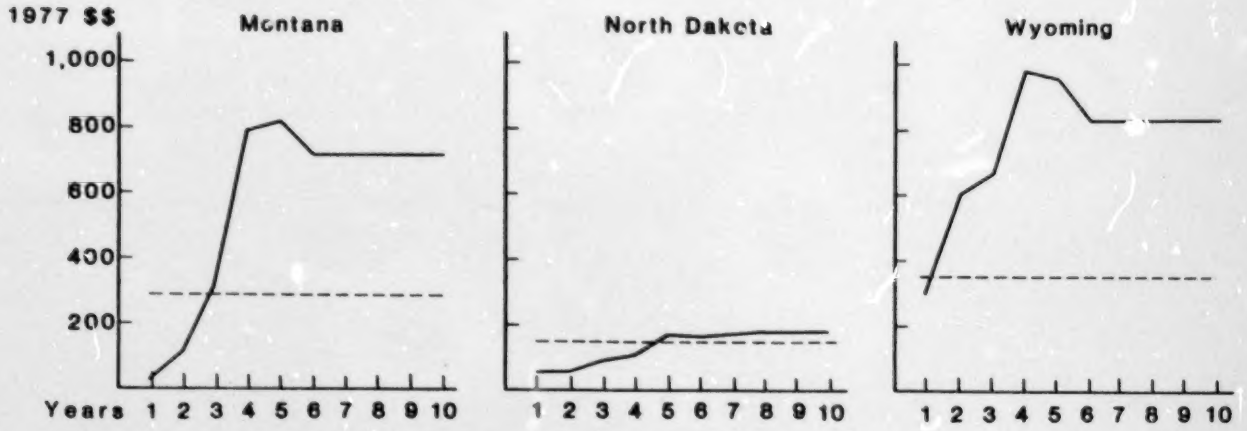

Figure 7. Generating plant*: New county government revenues per new resident due to construction and operation. Key: ———— = Estimated revenues per new resident
--------- = Estimated per capita expenditures

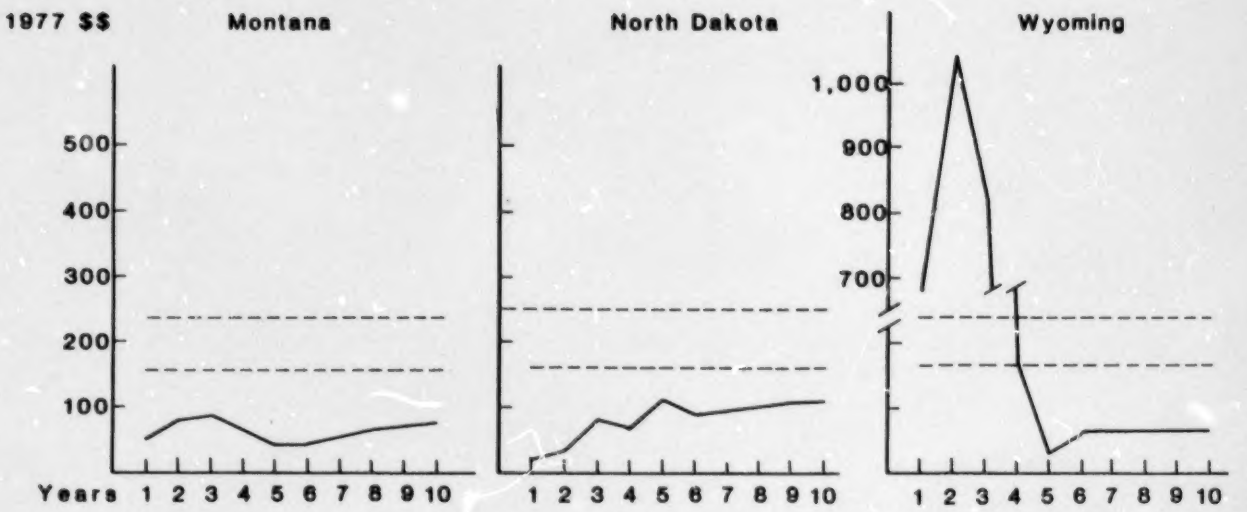

Figure 8. Generating plant*: New city government revenues per new resident due to construction and operation. Key: ———— = Estimated revenues per new resident
--------- = Estimated expenditures (total and operating)

*Generating plant refers to an 801-MWe coal-fired generator (see text).

SOURCE: ENERGYTAX simulations; U.S. Bureau of the Census, 1977 Census of Governments.

Mine and Generating Plant

Simulation results of revenue impacts of a minemouth generator and a feedstock mine are similar to those obtained when either the generator or mine is analyzed separately.

State government revenues are generally below average state per capita expenditures until both the mine and the plant begin operation. Once full production levels are reached, state revenues in Montana and North Dakota are substantially above existing spending levels while Wyoming revenues slightly exceed 1977 per capita spending levels (Figure 9). Montana has a front-end deficit for the first 3 years of construction; Wyoming, for years 2 through 5; and North Dakota, for years 3 and 4. Sales tax revenue combined with only a small construction crew during the first 2 years accounts for the early positive impacts in North Dakota and Wyoming. Front-end losses are easily covered in Montana and North Dakota once full production begins. It will take longer for Wyoming to overcome the early deficits.

School District. School districts in all three states face significant front-end problems during the first 2 years of construction (Figure 10). Relatively few new school-age children are expected during that time, though, so the total dollar value of the front-end deficit is not large. Wyoming per pupil revenues exceed average expenditures by the third year. New revenues exceed average per pupil expenditures by year 4 in Montana and by year 5 in North Dakota.

New longrun school revenues in Montana and Wyoming are substantially greater than 1977 spending levels, while revenues in North Dakota are almost equal to average per pupil expenditure It is possible for school districts in Montana and Wyoming to recoup any front-end losses from future revenues. North Dakota school districts, however, will not have that option.

County. Counties follow the same patterns as in the separate plant and mine simulations (Figure 11). Revenues exceed state average per capita expenditures by counties after year 2 in Wyoming, and after year 4 in Montana and North Dakota. The long-term level of revenue is large enough that the front-end deficit can be overcome in all states--especially in Wyoming and Montana, where longrun revenues are more than three times average expenditures.

City. Cities follow the same pattern as under the previous simulations (Figure 12). Montana city revenues are low throughout the entire period. North Dakota cities have a considerable deficit until year 6, when shares of severance taxes and coal conversion taxes are received from the state. After that point, new per capita revenue is only slightly less than expenditure by cities in the state. Wyoming, with its local sales tax, has a front-end surplus during the first 3 years of construction. But when new purchases by the mine and powerplant drop, local revenues drop almost to the level of Montana cities.

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In Wyoming, new city revenue per resident associated with the mine or powerplant's opening amounts to less than $100 in the long run. Average per capita city expenditures for the state were more than 2 1/2 times greater ($267) in 1977.

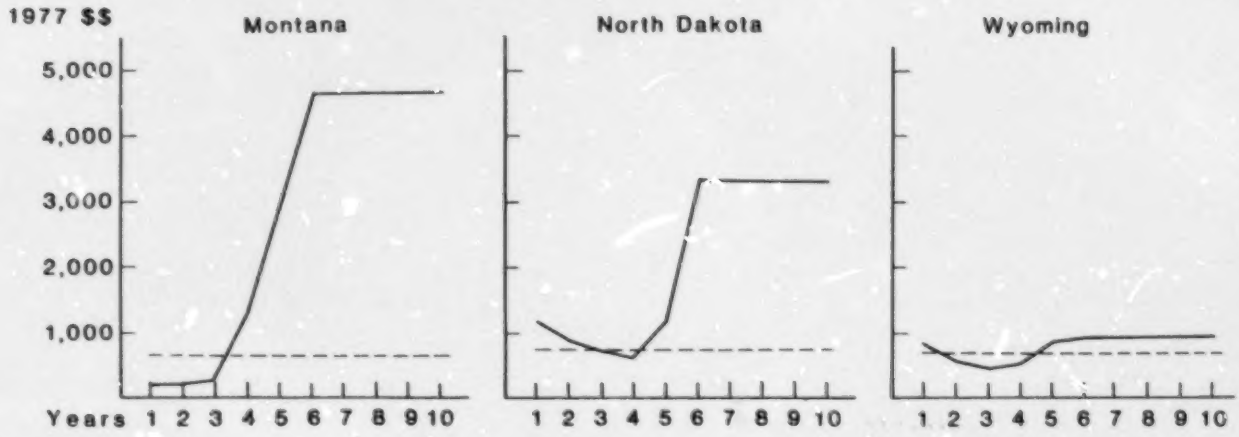

Figure 9. Mine and generating plant combination*: New state government revenues per new resident due to construction and operation.
Key: ———— = Estimated revenues per new resident
--------- = Estimated per capita expenditures

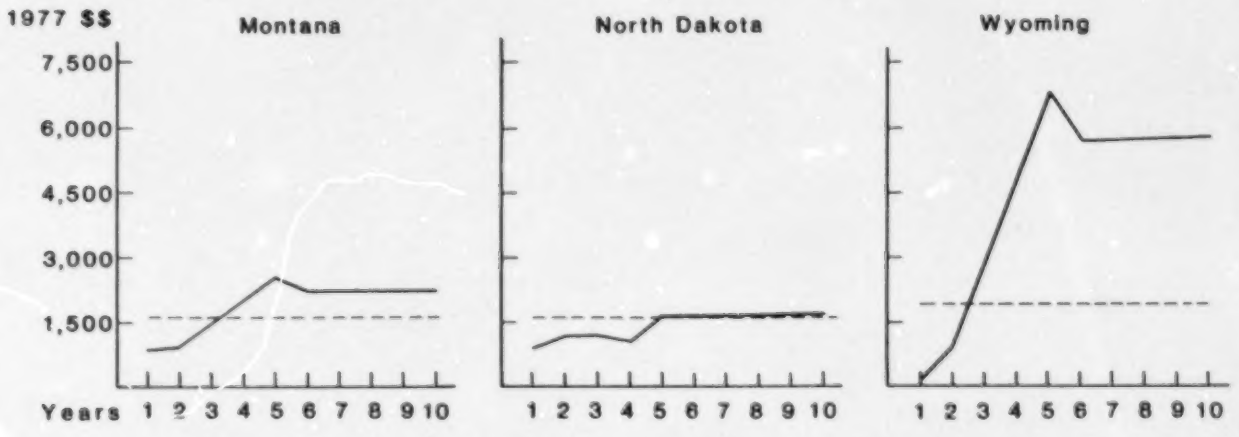

Figure 10. Mine and generating plant combination*: New school district revenues per new pupil due to construction and operation.
Key: ———— = Estimated revenues per new pupil
--------- = Estimated per pupil expenditures

*Mine is a 5-mmtpy coal strip mine; generating plant is an 801-MWe coal-fired generator (see text).

SOURCE: ENERGYTAX simulations; U.S. Bureau of the Census, 1977 Census of Governments.

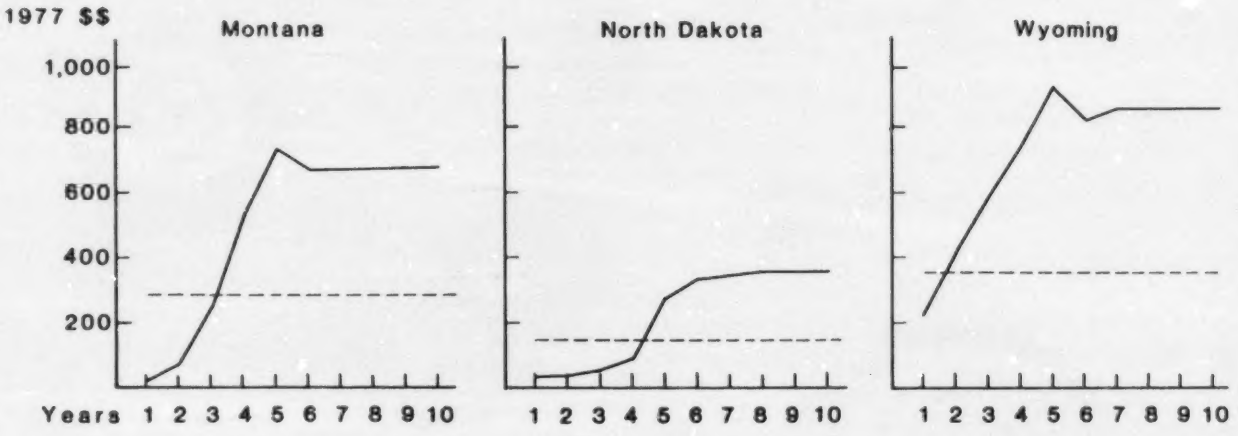

Figure 11. Mine and generating plant combination*: New county revenues per new resident due to construction and operation.
Key: ———— = Estimated revenues per new resident
--------- = Estimated per capita expenditures

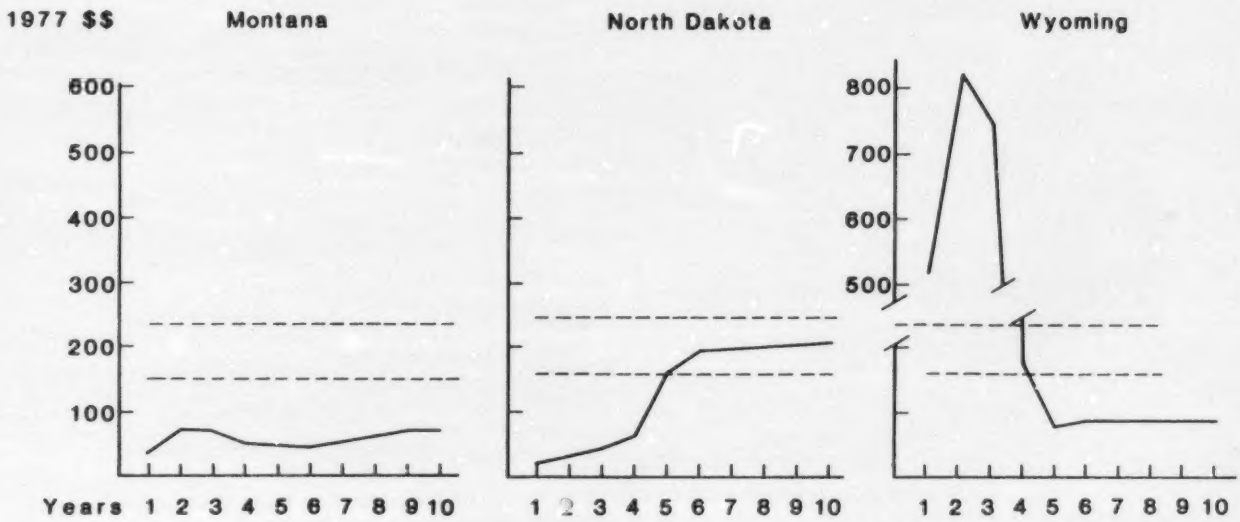

Figure 12. Mine and generating plant combination*: New city reveneus per new resident due to construction and operation.
Key: ———— = Estimated revenues per new resident
--------- = Estimated per capita expenditures(total and operating)

*Mine is a 5-mmtpy coal strip mine; generating plant is an 801-MWe coal-fired generator (see text).

SOURCE: ENERGYTAX simulations; U.S. Bureau of the Census, 1977 Census of Governments.

Summary

Special impact aid programs--ranging from state and federal loans to grants for local operating expenses--ease shortrun financial pressures faced by local governments when new energy projects are developed. Workers and their families moving to the area create an increased demand for local services such as education and police protection. Local revenues to pay for these services, however, increase much more slowly. This creates a shortrun imbalance between expenditures and revenues--a front-end problem.

Front-end problems occur when state and local revenues do not respond quickly to changes in the local economy. It takes time for property taxes and most state aid revenues to increase. Taxes based on output--such as severance taxes--yield nothing until after production begins. Sales taxes, particularly local sales taxes, respond more quickly, but they usually are not sufficient to cover all increases in service costs.

ENERGYTAX simulations were run to determine the potential size of front-end problems in Montana, North Dakota, and Wyoming. Three developments typical of those in the region were examined--a 5-million-ton-per-year coal mine, an 801-megawatt coal-fired generating plant, and a combination of the two.

Estimated front-end impacts are substantial for cities and counties in Montana and North Dakota. School districts in Wyoming also have shortrun revenue shortages. Since they receive revenue from both state and local sales tax on construction materials, cities and counties in Wyoming fare better than those in Montana and North Dakota during the early phases of construction. In some simulations, Wyoming municipalities received more in new sales tax revenues than they were expected to pay to provide services to the new residents.

The results of these simulations have several implications for state and federal policy on energy impact aid for local governments:

- **Short- and medium-term loans** can help mitigate local impacts of energy development. While potentially serious front-end problems exist, new local revenues accruing after the project begins production are often more than enough to finance needed local services and retire any debt incurred to cover front-end deficits.

- **Grants** can address the problems of cities and other local governments that are receiving new residents but are unable to tax the new mine or power plant directly. Without such aid, tax rates in those communities would have to increase to meet expenditure needs. Continuing

aid from state or federal programs will likely be required.

- **Special impact aid** should be used in some cases for local government operating costs as well as capital expenditures, since new revenues are sometimes less than state average levels of operating expenditures by similar types of local governments.

Conclusions

Local governments face potential front-end problems from new development. The local property tax system--even when assessment is done on a percentage-completed basis--simply does not react quickly enough to eliminate deficits during the first 2 years of any project's life. The problem becomes more acute when the construction period is long and the construction work force large compared to the operating crew. Programs returning a portion of state revenues from a tax based on production--such as North Dakota's program returning a portion of the state severance tax and coal conversion tax--do not become effective soon enough. There can be lags of up to 6 years before new revenues match average per capita government expenditures.

A local sales tax such as Wyoming's can help limit front-end problems. But even with that sales tax, simulated new revenues for Wyoming cities drop well below average per capita expenditures after year 3 of the 5 year construction and startup period in both the combined and the generating plant scenarios. Local sales taxes alone cannot fully solve the front-end problems since construction-related purchases do not remain high indefinitely.

The property tax base in Montana and Wyoming includes the value of business personal property (equipment and machinery). Front-end problems there are eliminated after 2 years for those governments which can tax the new installation. But not all local governments possess such authority. Cities and school districts and counties not containing the new mine or plant but receiving new residents have serious financial problems in the absence of special aid programs.

North Dakota's program of sharing a portion of state-collected severance and energy conversion taxes with local governments makes particularly good sense, although it does not solve the front-end problem. Communities get sufficient revenue to cover longrun operating costs, even when the new plant or mine is not part of the local property tax base. However, this program has no impact on the front-end problem, since revenues do not accrue until after the new mine or powerplant begins production.

State impact aid programs help all local governments during the first 2 or 3 years of construction in states where there is no local sales tax. This aid need not be grants in all instances. Counties and school districts in Montana and Wyoming, for example, could be aided by loans to be paid back out of surplus revenues generated once the increase in assessed values is translated into new property taxes. But cities in all three states, as well as counties and school districts in North Dakota, appear to need a different type of aid. They require grants, since without an increase in local tax rates there will never be a sufficient surplus of revenue generated to pay back the loans. Finally, since revenues do not even exceed operating expenditures in some instances, impact aid programs should allow funds to be spent for operating costs as well as capital purposes.

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Appendix

Appendix Table 1. Mine:* Annual purchases, assessed values, and production.

Item	Units	Year 1	2	3	4	5	6	7	8
Purchases	$1000	8,078	9,265	8,437	3,948	3,948	3,948	3,948	3,948
Production	mmtpy	0	0	.5	3.5	5	5	5	5
Land Value	$1000	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5
Personal Property	$1	0	7,584	15,760	19,466	23,469	23,469	23,469	23,469

*Mine is a 5-mmtpy coal strip mine (see text).

Appendix Table 2. Generating plant:* Annual purchases, assessed values, and output.

Item		Year 1	2	3	4	5	6	7	8	9	10
Purchases	$1000	26,690	87,641	86,689	10,494	150	3,578	3,578	3,578	3,578	3,578
Production	MWe	0	0	0	0	200	521	521	521	521	521
Land Value	$1000	360	360	360	360	360	360	360	360	360	360
Personal property	$1	0	15,314	82,180	177,590	227,624	279,636	279,636	279,636	279,636	279,636

Appendix Table 3. Mine and generating plant combination:* Annual purchases, assessed value, and output.

Item	Units	Year 1	2	3	4	5	6	7	8	9	10
Purchases	$1000	26,690	95,370	95,984	15,236	5,016	4,308	4,308	4,308	4,308	4,308
Production	MWe	0	0	0	0	200	521	521	521	521	521
Production	mmtpy	0	0	0	.5	3.5	5	5	5	5	5
Mine property value	$1000	97.5	97.5	7,681	19,563	23,566	23,566	23,566	23,566	23,566	23,566
Plant property value	$1	360	15,674	82.540	177,950	277,984	279,996	279,996	279,996	279,996	279,996

*Mine is a 5-mmtpy coal strip mine; generating plant is an 801-MWe coal-fired generator (see text).

Appendix Table 4. Mine:* Employment and demographic assumptions.

Item	Year 1	2	3	4	5	6	7	8
				Number				
Employment:								
Mine	90	146	83	157	157	157	157	157
Service Sector	0	51	39	77	77	77	77	77
Total	90	197	122	234	234	234	234	234
Population:								
New residents (local)	198	317	225	592	675	675	675	675
New school children	45	87	75	189	230	230	230	230
Housing choice:								
Single-family dwelling	15	34	45	86	111	135	135	135
Apartment	0	35	35	35	35	35	35	35
Mobile home	75	75	22	75	50	36	36	36
Outside local economy	0	29	0	0	0	0	0	0

*Mine is a 5-mmtpy coal strip mine; generating plant is an 801-MWe coal-fired generator (see text).

Appendix Table 5. Generating plant:* Employment and demographic assumptions.

Item	Year 1	2	3	4	5	6	7	8	9	10
						Number				
Employment										
Plant	241	972	1,315	310	189	222	222	222	222	222
Service Sector	0	97	132	109	83	111	111	111	111	111
Total	241	1,069	1,447	419	272	333	333	333	333	333
Population										
New residents (local)	306	663	871	656	793	932	932	932	932	932
New school children	85	184	242	283	266	325	325	325	325	325
Housing choice										
Single-family	10	19	31	44	81	132	169	191	191	191
Apartment	10	45	45	45	45	45	45	45	45	45
Mobile Home	150	375	375	299	110	101	64	41	41	41
Outside local economy	71	737	996	0	0	0	0	0	0	0

*Mine is a 5-mmtpy coal strip mine; generating plant is an 801-MWe coal-fired generator (see text).

Appendix Table 6. Mine and generating plant combination:* Employment and demographic assumptions.

Item	Year 1	2	3	4	5	6	7	8	9	10
					Number					
Employment										
Mine	0	90	146	83	157	157	157	157	157	157
Plant	241	972	1,315	310	189	222	222	222	222	222
Service Sector	0	269	222	197	173	190	190	190	190	190
Total	241	1,683	1,783	590	519	569	569	569	569	569
Population:										
New residents (local)	396	1,005	1,153	1,082	1,296	1,596	1,596	1,596	1,596	1,596
New school children	90	228	262	359	415	556	556	556	556	556
Housing choice:										
Single family	10	27	58	105	167	242	305	328	328	328
Apartment	10	40	76	76	76	76	76	76	76	76
Mobile Home	160	390	390	311	190	157	94	71	71	71
Outside local economy	61	673	1,014	0	0	0	0	0	0	0

*Mine is a 5-mmtpy coal strip mine; generating plant an 801-MWe coal-fired plant (see text).

Appendix Table 7. Average per capita expenditures by state and local governments, 1977.

Type of Expenditure	Montana	North Dakota	Wyoming
		Dollars	
State:			
Total	651	716	699
Operating only	474	579	477
School district:			
Total [1]	1,657	1,601	1,980
Operating only [1]	1,544	1,452	1,660
County:			
Total	289	152	355
Operating only	255	123	315
City:			
Total	237	248	237
Operating only	155	161	164

[1] Expenditure per pupil.

Source: U.S. Bureau of the Census, 1977 Census of Governments, Vols. 4-1, 4-3, 4-4, 5.

Appendix Table 8. Montana mine:* Estimated new state and local government revenues due to development, 1979.

Revenue source	Year 1	2	3	4	5	6	7	8
	Dollars							
State:								
Taxes on--								
Mine	13,470	24,065	779,497	5,405,239	7,717,399	7,717,399	7,717,399	7,717,399
Workers	55,846	109,312	64,979	129,606	130,123	130,453	130,833	131,054
Equalization revenue	2,071	7,602	52,206	321,714	457,092	460,041	463,433	465,410
State aid and earmarked revenue	33,157	61,304	568,790	3,761,943	5,359,268	5,359,265	5,359,265	5,352,695
Total	38,230	79,675	327,892	2,094,616	2,945,346	2,948,628	2,952,400	2,961,168
School district:								
Taxes on--								
Mine	262	8,401	47,076	239,469	317,283	317,283	317,283	317,283
Workers	1,039	3,267	2,828	9,033	11,315	13,124	15,205	16,419
Other new business	0	496	448	1,161	1,104	1,104	1,104	1,104
New state aid	30,735	56,030	50,243	115,701	148,321	148,321	148,321	148,321
Total	32,036	68,194	100,595	365,364	478,023	479,832	481,913	483,127
County:								
Taxes on--								
Mine	313	10,006	56,071	226,057	317,928	317,928	317,928	317,928
Workers	1,237	3,627	3,369	8,264	11,064	12,833	14,868	16,055
Other new business	0	753	534	1,062	1,080	1,080	1,080	1,080
New state aid	1,476	3,249	12,928	80,193	112,996	112,996	112,996	112,996
Total	3,026	17,635	72,902	315,576	443,068	444,837	446,872	448,059
City:								
Taxes on--								
Mine	0	0	0	0	0	0	0	0
Workers	3,351	9,823	9,125	22,383	29,964	34,755	40,267	43,481
Other new business	0	2,039	1,449	2,877	2,924	2,924	2,924	2,924
New state aid	944	2,024	1,386	2,824	3,012	3,012	3,012	3,012
Total	4,295	13,886	11,960	28,084	35,900	40,691	46,203	49,417
New revenue per capita:								
State	193	251	1,457	3,538	4,363	4,368	4,374	4,387
School district[1]	712	821	1,341	1,933	2,078	2,078	2,087	2,100
County	15	56	324	533	656	659	662	664
City	22	44	53	47	53	60	68	73

[1] Revenue is per pupil for school district.
Source: ENERGYTAX simulations
*Mine is a 5-mmtpy coal strip mine (see text).

Appendix Table 9. North Dakota mine:* Estimated new state and local government revenues due to development, 1979.

Revenue Source	Year 1	2	3	4	5	6	7	8
	Dollars							
State:								
Taxes on--								
Mine	248,499	307,044	620,527	3,313,204	4,653,894	4,653,894	4,653,894	4,653,894
Workers	71,361	129,540	106,723	132,431	132,520	132,559	132,607	132,656
State aid and earmarked revenue	36,221	52,531	156,899	2,232,871	3,150,885	3,150,431	3,149,847	3,149,26[illegible]
Total	283,639	384,053	570,351	1,212,764	1,635,529	1,636,022	1,636,654	1,637,286
School district:								
Taxes on--								
Mine	40	40	40	7,797	7,797	7,797	7,797	7,797
Workers	1,101	4,586	3,658	12,298	22,793	27,185	32,841	38,496
Other new business	0	2,597	1,842	11,170	11,170	11,170	11,170	11,170
New state aid	38,655	62,707	53,422	355,021	474,990	474,045	472,829	471,613
Total	39,796	69,930	58,962	386,286	516,750	520,197	524,637	529,076
County:								
Taxes on--								
Mine	23	23	23	4,527	4,527	4,527	4,527	4,527
Workers	639	2,663	2,130	7,140	13,235	15,785	19,069	22,353
Other new business	0	1,508	1,185	6,092	6,486	6,486	6,486	6,486
New state aid	6,978	11,490	40,598	251,473	354,167	354,167	354,834	355,209
Total	7,640	15,684	43,936	269,232	378,415	380,965	384,916	388,575
City								
Taxes on--								
Mine	0	0	0	0	0	0	0	0
Workers	1,440	3,755	2,600	7,069	11,255	13,002	15,252	17,502
Other new business	0	1,053	733	4,420	4,444	4,444	4,444	4,444
New state aid	2,609	4,350	21,642	138,877	196,727	196,927	197,184	197,442
Total	4,049	9,158	24,975	150,366	212,426	214,373	216,880	219,388
New revenue per capita								
State	1,433	1,008	2,535	2,049	2,423	2,424	2,425	2,426
School district[1]	884	958	1,113	2,043	2,246	2,261	2,281	2,300
County	39	49	195	454	558	561	566	571
City	20	28	100	254	314	318	321	325

[1] Revenue is per pupil for school district.
Source: ENERGYTAX simulations
* Mine is a 5-mmtpy coal strip mine (see text).

Appendix Table 10. Wyoming mine:* Estimated new state and local government revenue due to development, 1979.

Revenue source	Year 1	2	3	4	5	6	7	8
	Dollars							
State:								
Taxes on--								
Mine	239,658	332,653	481,921	2,201,578	3,075,611	3,075,611	3,075,611	3,075,611
Workers	29,303	49,275	28,796	59,076	59,816	60,376	60,737	60,913
State aid and earmarked revenue	125,614	165,119	338,909	1,438,972	2,009,277	2,009,277	2,009,277	2,009,277
Total	143,347	216,809	179,808	821,682	1,126,150	1,126,710	1,127,071	1,127,247
School district:								
Taxes on--								
Mine	0	0	220,945	914,944	1,262,514	1,262,514	1,262,514	1,262,514
Workers	2,342	12,326	11,682	25,791	31,880	36,448	39,400	40,835
Other new business	0	7,414	5,260	10,461	10,461	10,461	10,461	10,461
New state aid	4,145	7,921	6,908	17,132	21,185	21,185	21,185	21,185
Total	8,487	27,661	244,795	968,328	1,326,040	1,330,608	1,333,560	1,334,995
County:								
Taxes on--								
Mine	22,646	27,796	94,591	344,563	472,012	472,012	472,012	472,012
Workers	2,323	8,435	6,531	13,521	15,735	17,395	18,469	18,992
Other new business	0	2,696	1,913	3,804	3,804	3,804	3,804	3,804
New state aid	29,687	37,844	47,260	69,310	87,900	88,113	88,250	88,317
Total	54,656	76,771	150,295	431,198	579,451	581,324	582,535	583,125
City:								
Taxes on--								
Mine	52,842	64,858	33,204	27,638	30,102	30,102	30,102	30,102
Workers	6,248	12,990	7,556	14,584	15,746	17,181	17,181	17,445
Other new business	0	1,415	1,004	1,996	1,996	1,996	1,996	1,996
New state aid	65,982	84,145	47,317	50,605	54,265	54,265	54,265	54,265
Total	125,072	163,408	89,081	94,823	102,109	103,544	103,544	103,808
New revenue per capita:								
State	724	569	799	1,388	1,668	1,669	1,670	1,670
School district[1]	189	318	3,264	5,123	5,765	5,785	5,798	5,804
County	276	243	670	728	858	861	863	864
City	632	515	395	160	151	153	153	154

[1] Revenue is per pupil for school district.
Source: ENERGYTAX simulations
*Mine is a 5-mmtpy coal strip mine (see text).

Appendix Table 11. Montana generating plant:* Estimated new state and local government revenues due to development, 1979.

Revenue source	Year 1	2	3	4	5	6	7	8	9	10
	Dollars									
State:										
Taxes on--										
Plant	35,861	154,810	251,048	161,168	526,243	4,247,678	4,247,678	4,247,678	4,247,678	4,247,678
Workers	213,427	833,252	1,067,604	275,505	119,161	127,926	128,533	129,180	129,663	129,842
Equalization revenue	7,604	98,495	430,647	842,590	1,068,317	1,101,760	1,107,179	1,112,952	1,117,271	1,118,869
State aid and earmarked revenue	56,421	174,674	185,672	160,127	119,839	233,760	232,055	232,055	232,055	232,055
Total	200,471	911,883	1,563,627	1,119,136	1,593,882	5,243,604	5,251,335	5,257,755	5,262,557	5,264,334
School district:										
Taxes on--										
Plant	0	64,363	245,526	450,058	548,680	586,837	586,024	585,573	585,573	585,114
Workers	7,691	22,849	36,854	11,439	8,725	11,261	14,182	17,299	19,627	20,488
Other new business	0	0	1,432	1,181	905	1,154	1,208	1,208	1,208	1,208
New state aid	73,268	148,168	151,467	149,004	110,765	222,914	221,193	221,193	221,193	221,193
Total	80,959	235,380	435,279	611,682	669,075	822,166	822,607	825,273	827,601	828,003
County:										
Taxes on-										
Plant	0	43,614	237,327	493,023	631,207	648,610	648,610	648,610	648,610	648,610
Workers	4,562	16,743	22,775	15,719	10,038	12,447	15,697	19,161	21,752	22,799
Other new business	0	0	1,808	1,492	1,144	1,527	1,527	1,527	1,527	1,527
New state aid	4,443	17,030	22,127	6,950	5,512	6,585	6,595	6,595	6,595	6,595
Total	9,005	77,387	284,037	517,184	647,901	669,169	672,429	675,893	678,484	679,531
City:										
Taxes on--										
Plant	0	0	0	0	0	0	0	0	0	0
Workers	12,357	41,934	57,041	33,937	27,185	33,709	42,514	51,896	58,914	61,510
Other new business	0	0	4,898	4,041	3,097	4,134	4,134	4,134	4,134	4,134
New state aid	2,553	9,475	12,078	4,172	3,561	4,260	4,267	4,267	4,267	4,267
Total	14,910	51,409	74,017	42,150	33,843	42,103	50,915	60,297	67,315	69,911
New revenue per capita:										
State	246	267	338	1,705	2,009	5,626	5,634	5,641	5,646	5,648
School district[1]	952	1,273	1,732	2,155	2,508	2,524	2,531	2,539	2,546	2,547
County	30	116	326	788	821	718	721	725	728	729
City	49	77	85	64	42	45	55	65	72	75

[1] Revenue is per pupil for school district.
Source: ENERGYTAX simulations
* Generating plant is an 801-MWe coal-fired generator (see text).

Appendix Table 12. North Dakota generating plant:* Estimated new state and local govenment revenues due to development, 1979.

Revenue source	Year 1	2	3	4	5	6	7	8	9	10
	Dollars									
State:										
Taxes on--										
Plant	843,303	2,795,381	2,832,726	475,670	4,117,039	4,117,039	4,114,039	4,117,039	4,117,039	4,117,039
Workers	159,007	608,283	770,859	103,791	181,449	181,438	181,495	181,582	181,655	181,699
State aid and earmarked revenue	82,959	234,874	239,166	246,693	469,630	530,823	530,308	529,507	528,838	528,436
Total	919,351	3,168,790	3,364,419	332,768	3,828,858	3,767,654	3,768,226	3,769,114	3,769,856	3,770,302
School district:										
Taxes on--										
Plant	8,370	8,370	8,370	8,370	8,370	8,370	8,370	8,370	8,370	8,370
Workers	7,811	16,403	20,645	27,342	24,436	23,202	29,741	39,916	48,423	53,530
Other new business	0	0	68,607	13,446	15,794	15,794	15,794	15,794	15,794	15,794
New state aid	71,303	199,866	203,789	246,250	300,510	361,873	360,464	358,275	356,446	355,348
Total	87,484	224,639	301,411	295,408	349,110	409,239	414,369	422,355	429,033	433,042
County:										
Taxes on--										
Plant	4,860	4,860	4,860	4,860	4,860	21,735	21,735	21,735	21,735	21,735
Workers	4,536	9,524	11,987	10,070	14,789	13,463	17,268	23,177	28,116	31,082
Other new business	0	0	39,837	9,831	9,171	9,171	9,171	9,171	9,171	9,171
New state aid	8,371	24,364	25,196	45,826	109,918	109,734	109,658	110,845	111,410	111,749
Total	17,767	38,748	81,880	70,587	138,738	154,103	157,832	164,928	170,432	173,737
City:										
Taxes--										
Plant	0	0	0	0	0	0	0	0	0	0
Workers	5,812	13,475	16,152	12,337	18,687	17,303	21,319	27,557	32,707	35,901
Other new business	0	0	42,049	8,241	9,680	9,680	9,680	9,680	9,680	9,680
New state aid	3,283	9,643	10,181	24,417	59,301	59,214	59,673	60,386	60,981	61,339
Total	9,095	23,118	68,382	44,995	87,668	86,197	90,672	97,623	103,368	106,920
New revenue per capita:										
State	1,139	928	719	507	4,828	4,042	4,043	4,044	4,045	4,045
School district[1]	1,029	1,220	1,245	1,043	1,312	1,259	1,275	1,300	1,320	1,332
County	58	58	94	107	175	165	169	177	183	186
City	26	35	78	68	110	92	97	104	110	114

1 Revenue is per pupil for school district.
Source: ENERGYTAX simulations
* Generating plant is an 801-MWe coal-fired generator (see text).

Appendix Table 13. Wyoming generating plant:* Estimated new state and local government revenues due to development, 1979.

Revenue source	Year 1	2	3	4	5	6	7	8	9	10
	Dollars									
State:										
Taxes on--										
Plant	836,074	2,785,127	2,892,086	573,416	305,332	443,282	443,282	443,282	443,282	443,282
Workers	61,206	224,590	272,020	100,518	63,405	86,219	87,064	87,237	87,237	87,237
State aid and earmarked revenue	215,172	745,166	748,761	144,760	55,078	95,100	95,100	95,100	95,100	95,100
Total	682,108	2,264,551	2,415,345	529,174	313,659	434,401	435,246	435,419	435,419	435,419
School district:										
Taxes on--										
Plant	315	123,311	646,414	1,396,528	1,789,444	1,789,444	1,789,444	1,789,444	1,789,444	1,789,444
Workers	5,468	36,068	55,513	60,054	60,696	49,708	56,630	58,047	58,047	58,047
Other new business	0	13,163	17,808	14,693	12,797	15,032	15,032	15,032	15,032	15,032
New state aid	7,829	21,738	22,199	24,409	20,817	29,752	29,751	29,751	29,751	29,751
Total	13,612	194,280	741,934	1,495,684	1,883,754	1,883,936	1,890,857	1,892,274	1,892,274	1,892,274
County:										
Taxes on--										
Plant	24,135	159,639	313,169	517,467	651,230	655,083	655,083	655,083	655,083	655,083
Workers	4,179	21,450	30,696	24,669	23,176	20,089	22,608	23,123	23,123	23,123
Other new business	0	4,788	6,478	5,345	4,655	5,468	5,468	5,468	5,468	5,468
New state aid	62,135	212,121	238,259	95,701	88,808	98,154	98,476	98,543	98,543	98,543
Total	90,449	397,998	588,602	643,182	767,869	778,794	781,635	782,217	782,217	782,217
City:										
Taxes on--										
Plant	56,049	183,668	182,046	22,037	643	9,633	9,633	9,633	9,633	9,633
Workers	6,153	21,320	35,096	18,045	14,138	14,166	15,487	15,757	15,757	15,757
Other new business	0	2,511	3,397	2,803	2,442	2,868	2,868	2,868	2,868	2,868
New state aid	146,666	485,346	487,311	70,120	10,587	28,124	28,124	28,124	28,124	28,124
Total	208,868	692,845	707,850	113,005	27,810	54,791	56,112	56,382	56,382	56,382
New revenue per capita:										
State	830	663	552	806	396	466	467	467	467	467
School district[1]	160	1,055	3,065	5,285	7,082	5,796	5,818	5,822	5,822	5,822
County	295	600	675	980	968	835	839	839	839	839
City	682	1,045	824	168	35	59	60	61	61	61

[1] Revenue is per pupil for school district.
Source: ENERGYTAX simulations
* Generating plant is an 801-MWe coal-fired generator (see text).

Appendix Table 14. Montana mine and generating plant combination:* Estimated new state and local government revenues due to development, 1979.

Revenue source	Year 1	2	3	4	5	6	7	8	9	10
					Dollars					
State:										
Taxes on--										
Mine	0	13,470	24,064	538,974	3,720,619	5,305,003	5,304,999	5,304,996	5,304,993	5,304,993
Plant	35,861	154,810	251,048	161,167	526,243	4,247,678	4,247,678	4,247,678	4,247,678	4,247,678
Workers	177,362	722,016	919,691	310,562	248,942	258,054	259,994	260,042	260,730	260,730
Equalization revenue	7,824	113,155	443,063	899,969	1,394,124	1,561,002	1,569,393	1,578,750	1,584,889	1,584,889
State aid and earmarked revenue	47,528	188,983	188,387	575,940	2,754,955	3,893,044	3,893,041	3,893,038	3,893,036	3,893,036
Total	173,519	814,468	1,449,479	1,334,732	3,134,973	7,478,693	7,489,023	7,498,428	7,505,254	7,505,254
School district:										
Taxes on--										
Mine	0	235	7,567	49,157	197,553	279,669	279,482	279,275	279,140	279,140
Plant	0	36,618	199,255	456,315	559,977	579,261	578,839	578,379	578,071	578,071
Workers	7,939	17,277	21,244	15,754	17,078	21,022	21,608	29,086	33,752	33,752
Other new business	0	3,102	2,564	2,502	2,111	2,327	2,326	2,324	2,322	2,322
New state aid	76,885	175,215	173,896	218,872	284,579	368,940	368,940	368,940	368,940	368,940
Total	84,824	232,447	404,526	742,600	1,061,298	1,251,219	1,251,195	1,258,004	1,262,225	1,262,225
County:										
Taxes on--										
Mine	0	312	10,000	55,948	226,011	317,674	317,674	317,674	317,674	317,674
Plant	0	43,614	237,327	493,024	631,207	648,610	648,610	648,610	648,610	648,610
Workers	4,694	20,579	25,275	17,027	19,250	23,539	28,573	34,188	37,872	37,872
Other new business	0	3,695	3,053	2,702	2,379	2,606	2,606	2,606	2,606	2,606
New state aid	2,390	8,479	8,964	14,085	60,778	83,414	83,414	83,413	83,413	83,413
Total	7,084	76,679	284,619	582,786	939,625	1,075,843	1,080,877	1,086,491	1,090,175	1,090,175
City:										
Taxes on--										
Mine	0	0	0	0	0	0	0	0	0	0
Plant	0	0	0	0	0	0	0	0	0	0
Workers	12,714	55,734	68,454	46,114	52,135	63,750	77,385	92,592	102,569	102,569
Other new business	0	10,007	8,271	7,319	6,443	7,057	7,058	7,058	7,058	7,058
New state aid	1,514	5,289	5,527	4,409	6,653	7,289	7,289	7,289	7,289	7,289
Total	14,228	71,030	82,252	57,842	65,231	78,096	91,732	106,939	116,916	116,916
New Revenue per capita:										
State	215	203	275	1,233	2,897	4,686	4,692	4,698	4,703	4,703
School district[1]	943	1,019	1,543	2,068	2,557	2,256	2,257	2,265	2,270	2,270
County	18	76	247	539	725	674	677	681	683	683
City	36	71	71	53	50	49	57	67	73	73

1 Revenue is per pupil for school district.
Source: ENERGYTAX simulations
* Mine is a 5-mmtpy coal strip mine: generating plant is an 801-MWe coal-fired generator (see text).

Appendix Table 15. North Dakota mine and generating plant combination:* Estimated new state and local government revenues due to development, 1979.

Revenue source	Year 1	2	3	4	5	6	7	8	9	10
					Dollars					
State:										
Taxes on--										
Mine	0	318,499	398,245	650,528	3,317,204	4,653,894	4,653,894	4,653,894	4,653,894	4,653,894
Plant	843,302	2,795,381	2,832,726	369,594	475,670	4,069,668	4,069,668	4,069,668	4,069,668	4,069,668
Workers	161,024	648,652	821,213	335,459	259,339	270,853	270,959	271,083	271,166	271,188
State aid and earmarked revenue	88,193	287,564	307,204	647,370	2,541,364	3,664,065	3,663,095	3,661,960	3,661,202	3,661,000
Total	916,133	3,474,968	3,744,980	708,211	1,510,849	5,330,350	5,331,426	5,332,685	5,333,526	5,333,750
School district:										
Taxes on--										
Mine	0	40	40	40	7,796	7,797	7,797	7,797	7,797	7,797
Plant	8,370	8,370	8,370	8,370	8,370	8,370	8,370	8,370	8,370	8,370
Workers	8,283	30,217	33,340	37,210	42,924	52,506	64,910	79,283	88,925	91,484
Other new business	0	0	26,964	27,959	24,616	26,965	26,964	26,965	26,965	26,965
New state aid	75,850	251,620	266,473	349,265	583,724	817,077	814,421	811,318	809,245	808,695
Total	92,503	290,247	335,187	422,844	667,430	912,715	922,462	933,733	941,302	943,311
County:										
Taxes on--										
Mine:	0	23	23	23	4,527	4,527	4,527	4,527	4,527	4,527
Plant	4,860	4,860	4,860	4,860	4,860	21,735	21,735	21,735	21,735	21,735
Workers	4,810	16,665	19,359	21,605	24,986	30,487	37,658	46,035	51,634	53,120
Other new business	0	0	15,656	11,936	14,293	15,657	15,657	15,657	15,657	15,657
New state aid	8,496	25,314	27,789	56,663	302,650	465,029	465,848	466,807	467,447	467,616
Total	18,166	46,862	67,687	95,087	351,316	537,435	545,425	554,761	561,000	562,655
City:										
Taxes--										
Mine	0	0	0	0	0	0	0	0	0	0
Plant	0	0	0	0	0	0	0	0	0	0
Workers	6,166	22,195	24,410	26,356	31,127	37,460	45,028	53,871	59,781	61,349
Other new business	0	0	16,526	17,138	15,087	16,526	16,526	16,526	16,526	16,526
New state aid	3,489	10,630	12,096	28,943	166,403	256,959	257,824	258,834	259,510	259,689
Total	9,655	32,825	53,032	72,437	212,617	310,945	319,378	329,231	335,817	337,564
New revenue per capita:										
State--	1,135	867	711	654	1,165	3,340	3,340	3,341	3,342	3,342
School district[1]	1,028	1,273	1,279	1,178	1,608	1,642	1,659	1,679	1,692	1,697
County	46	47	59	88	271	337	342	348	351	353
City	24	33	46	67	164	195	200	206	210	212

1 Revenue is per pupil for school district.
Source: ENERGYTAX simulations
* Mine is a 5-mmtpy coal strip mine; generating plant is an 801-MWe coal-fired generator (see text).

Appendix Table 16. Wyoming mine and generating plant combination:* Estimated new state and local government revenues due to development, 1979.

Revenue source	Year 1	2	3	4	5	6	7	8	9	10
					Dollars					
State:										
Taxes on--										
Mine	0	239,657	339,742	458,193	2,201,593	3,075,964	3,075,694	3,075,964	3,075,964	3,075,964
Plant	836,073	2,785,127	2,892,086	573,416	305,351	443,282	443,282	443,282	443,282	443,282
Workers	62,366	228,472	607,744	125,988	121,501	146,301	146,637	147,775	148,394	148,547
State aid and earmarked revenue	228,432	849,961	880,912	581,571	1,494,275	2,104,945	2,104,945	2,104,945	2,104,945	2,104,945
Total	670,007	2,403,295	2,958,660	576,026	1,134,170	1,560,602	1,560,668	1,562,076	1,562,695	1,562,848
School district:										
Taxes on--										
Mine	0	0	37,093	220,945	914,950	1,262,535	1,262,535	1,262,535	1,262,535	1,262,535
Plant	315	123,311	646,414	1,396,528	1,789,444	1,789,444	1,789,444	1,789,444	1,789,444	1,789,444
Workers	5,467	26,548	46,017	68,350	78,596	83,674	83,674	92,996	98,058	99,359
Other new business	0	25,798	30,074	26,610	23,428	25,798	25,798	25,798	25,798	25,798
New state aid	7,829	27,633	29,199	32,791	38,133	51,121	51,121	51,121	51,121	51,121
Total	13,611	203,290	788,797	1,745,224	2,844,551	3,212,572	3,212,572	3,221,894	3,226,956	3,228,257
County:										
Taxes on--										
Mine	0	6,678	21,833	84,630	336,389	463,148	463,148	463,148	463,148	463,148
Plant	24,135	123,572	313,169	517,467	652,305	655,083	655,083	655,082	655,083	655,083
Workers	3,429	34,651	52,200	35,618	36,021	38,998	38,998	43,389	45,231	45,747
Other new business	0	9,385	10,940	9,680	8,523	9,385	9,385	9,385	9,385	9,385
New state aid	62,160	243,162	277,274	143,385	157,765	186,048	186,177	186,611	186,847	186,847
Total	89,724	417,448	675,416	790,780	1,191,003	1,352,662	1,352,791	1,357,615	1,359,694	1,360,210
City:										
Taxes on--										
Mine	0	15,852	19,457	9,961	8,291	9,031	9,031	9,031	9,031	9,031
Plant	56,049	183,668	182,046	22,037	3,150	9,633	9,633	9,633	9,633	9,633
Workers	4,176	63,380	91,520	38,132	32,334	37,750	38,185	40,054	41,019	41,259
Other new business	0	4,992	5,738	5,077	4,470	4,922	4,922	4,922	4,922	4,922
New state aid	146,906	553,997	570,576	118,286	61,226	82,501	82,501	82,501	82,501	82,501
Total	207,131	821,889	869,337	193,493	109,471	143,837	144,272	146,141	147,106	147,346
New revenue per capita:										
State	836	602	497	532	875	978	978	979	979	979
School district[1]	151	891	3,010	4,861	6,854	5,778	5,778	5,794	5,803	5,803
County	226	415	586	731	919	823	848	850	851	851
City	523	817	753	178	84	90	90	92	92	92

[1] Revenue is per pupil for school district.
Source: ENERGYTAX simulations
* Mine refers to a 5-mmpty coal strip mine; generating plant is an 801-MWe coal-fired generator (see text).

December 1982

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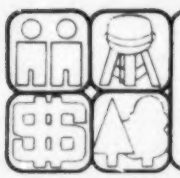

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